May 1, 1956 L. E. SACKS ET AL 2,743,733

AUTOMATIC TEST TUBE WASHER

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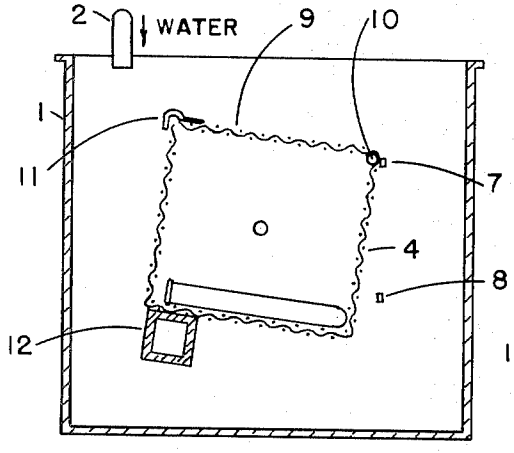



FIG. 1

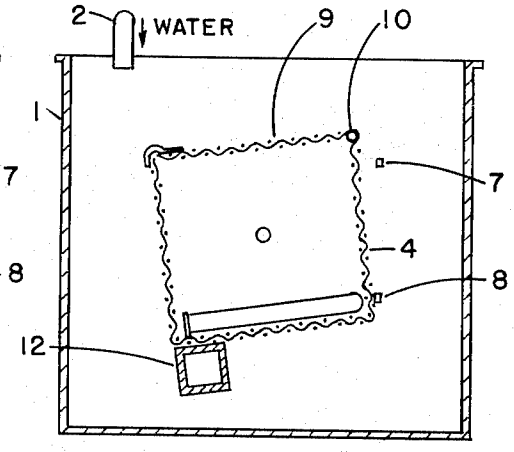



FIG. 2

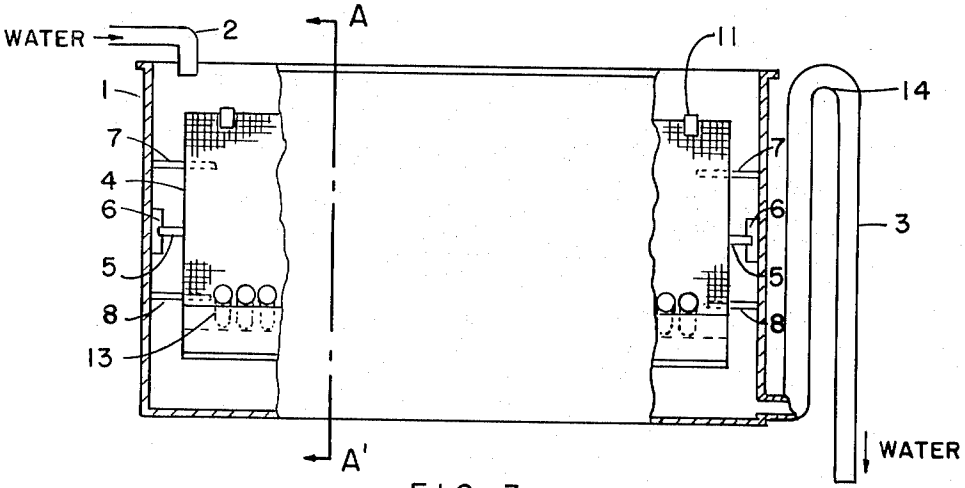



FIG. 3

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# AUTOMATIC TEST TUBE WASHER

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2 Claims. (Cl. 134—56)

(Granted under Title 35, U. S. Code (1952), sec. 266)

A non-exclusive, irrevocable, royalty-free license in the invention herein described, for all governmental purposes, throughout the world, with the power to grant sublicenses for such purposes, is hereby granted to the Government of the United States of America.

This invention relates to apparatus adapted to the washing or rinsing of articles, particularly vessels such as test tubes, beakers, flasks and other laboratory glassware.

The vessel-cleaning apparatus is particularly suited to the rinsing of laboratory glassware although it is also adapted to washing or rinsing of any type of vessel or article. In general the apparatus is provided with a suitable tank for the vessels, which tank is adapted to be periodically and automatically filled with water and then emptied, these cycles being repeated as often as necessary to thoroughly rinse the vessels. The filling and emptying cycles are accomplished by continuously running a liquid such as water into the tank and providing a syphon which will automatically empty the receptacle when it becomes filled to a predetermined level. The apparatus also includes automatic means for properly positioning the vessels during the filling and emptying cycles, that is, during the latter portion of the filling cycle, the vessels are positioned with their mouths up whereas during the latter portion of the emptying cycle, the vessels are positioned with their mouths down. By this means, both filling and emptying are complete and efficient. Thus during the filling cycle, the mouths of the vessels are up whereby the vessels are completely filled with water and there is no danger of the formation of air pockets which could prevent complete filling. Moreover, during the emptying cycle, the mouths of the vessels are down so that the vessels drain completely and there is no danger that portions of wash water will remain in the vessels to contaminate them. The automatic means for positioning the vessels employs the buoyant effect of a hollow body as affected by changes in water level to cause the automatic positioning of the vessels.

The construction of the apparatus is shown in Figs. 1, 2, and 3 of the drawing in which Fig. 1 is a section on the line A—A$^1$ of Fig. 3; Fig. 2 is a section similar to that of Fig. 1 but showing the apparatus in an emptied position; and Fig. 3 is a side elevation of the apparatus, partly in cross section.

Tank **1** is provided with pipe **2** for supplying water into the tank and syphon **3** for emptying the tank.

Within tank **1** is rotatably mounted basket **4** as a support for the vessels to be cleaned. The basket is made of wire screening or other perforate sheet material. Axles **5** attached to the ends of basket **4** fit into sockets **6** positioned on the end walls of tank **1**. This arrangement permits basket **4** to rotate about the axis defined by axles **5**. Stops **7** and **8** are provided to restrain the rotation of basket **4** within desired limits. Basket **4** is provided with a lid **9**, hinged at **10**, and provided with



spring catches **11** to hold it closed. A hollow body **12** is attached to the bottom of basket **4** to actuate a tipping motion. Thus when tank **1** is empty the basket is tipped by the weight of the hollow body **12** to the position shown in Fig. 2. When water enters tank **1** and surrounds hollow body **12** this hollow body exerts a buoyant effect and causes a rotation of the basket **4** to the position shown in Fig. 1.

The operation of the device shown in Figs. 1 to 3 is as follows:

Lid **9** is raised and the test tubes **13** are inserted in basket **4**. For the sake of simplicity only a single row of tubes are shown. In actual practice, as many tubes as desired may be placed in the basket. Lid **9** is then closed. The basket is then in the position shown in Fig. 2 with the mouths of the tubes down. In this position stops **8** prevent further rotation of the basket. Water is then introduced into tank **1** through pipe **2**. As the level of the water rises about hollow body **12** this body exerts a buoyant effect and the basket **4** is rotated to the position shown in Fig. 1, stops **7** preventing further rotation. In this position the mouths of tubes **13** are up thus preventing entrapment of air bubbles in the tubes. When the water level in tank **1** rises above point **14**, syphon **3** goes into action and all the water in the tank is drawn out by the syphon action. As the water level drops, hollow body **12** loses its buoyant effect and basket **4** again rotates to the position shown in Fig. 2. In this position, the mouths of the tubes are down so that all the water in the tubes is free to drain out. After tank **1** has been emptied, syphon **3** ceases to operate and since water is continuously introduced into tank **1** via pipe **2**, the periodic cycles of filling and emptying and tipping, as above described, proceed automatically. In the operation of this device, the rate of introduction of water through pipe **2** must be correlated with the inside diameter of syphon **3** so that during the emptying cycle, the water is drained out of the tank by the syphon much faster than the introduction of water through pipe **2**. Such correlation will ensure that the syphon action is broken when the tank is effectively drained whereby a new filling cycle will then start.

We claim:

1. A vessel-cleaning apparatus comprising a tank, a rotatable support for vessels to be cleaned positioned in said tank, means for introducing liquid into said tank, a syphon connected to said tank, said syphon cooperating with the liquid being introduced whereby the tank is periodically filled and emptied thus to clean said vessels, a hollow body attached to said rotatable support, said hollow body cooperating with the liquid level in said tank whereby to rotate the support to a position wherein the mouths of the vessels are up during the latter portion of the filling cycle and to rotate the support to a position wherein their mouths are down during the latter portion of the emptying cycle.

2. The apparatus of claim 1 wherein the rotatable support is a rotatable basket of perforate sheet material.

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